



TABLE OF CONTENTS

INTRODUCTION	
The euPOLIS Step Forward prof. Čedo Maksimović	04
euPOLIS vision: Improving Well-being with Nature-based Solutions Eftychios Protopapadakis	06
euPOLIS Legacy Across European Borders Juliana Uribe Aguado, Monica Marcela Giraldo Gonzalez, Juan Pablo Rodriguez Sanchez	10
The Civil City Framework for the Implementation of the Nature-Based Solutions Mikołaj Biesaga	15
Nature-Inspired Solutions' Route to the Market Eirini Marinou, Betty Charalampopoulou	20
Mainstreaming Innovation - The euPOLIS Solutions and Transfer of Knowledge Sotiria (Sandra) Baki, Athanasia Kazantzi	23
Planning Greener Cities for People Alfred Figueras Anton, Frida Seidelin, Alix Aliaga	27
Enhancing Public Health in Cities: The Benefits of Nature-Based Solutions and the euPOLIS Project Case Study Afroditi Mathioudaki	30
Advancing Urban Sustainability Through Nature-based Solutions, Evaluating the Impact of Intervention Eftychios Protopapadakis, Elerina Karolou	34
HEALTH Trees for Linear Park Ranko Božović	36
NBS Ecosystem – The euPOLIS Role Emmanuel Sardis	40
VFI @ GreenTech Amsterdam – All Eyes on Urban Horticulture Aleksandra Malušev, Daniel Podmirseg	44
NEWS by Aleksandra Malušev	
Urban Planning Gamification by euPOLIS	46
The Implementation of the euPOLIS philosophy: The Technology And The Mindset	48
euPOLIS Good Reads / Recommendations	51

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INTRODUCTION

The euPOLIS Step Forward

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This Issue of the euPOLIS magazine is devoted to the euPOLIS's project effort to elevate the concept of **Integrated health and well-being planning to the level and standards "Beyond the State-of-the-Art (BSoA)** contents. The concept and materials presented here originate from the purpose-organized event (Seminar: euPOLIS Beyond the State of the Art, held in Belgrade in late September 2022, to achieve cross-fertilization and to compile the breakthroughs in professional and scientific achievements as well as from the complementary follow-up.

This Issue of the Magazine presents to what level the euPOLIS project has reached the above main objective by tackling the following BSoA detailed objectives: (a) strengthening the "out of silos" approach in creating the project deliverables, (b) enhancing the "Beyond the State-of-the-Art - BSoA" contents of WPs and the 3 levels synergy roles of the WP leaders and (c) setting up the stage for the BSoA final project deliverables including euPOLIS Application Guideline securing its permanent legacy.

By loosening the silo boundaries, the following BSoA aspects are covered in the Magazine as separate topics

or in combination with other complementary ones.

- The methodology for euPOLIS project assessment beyond the effectiveness, including criteria such as impact, efficiency, coherence, relevance, and scalability through mental set-up change in four major groups of stakeholders: all project partners, planning authorities, professionals, and general public
- Initialization of 5 working groups (environmental, social, public health and wellbeing, business and urban development) for the systemic indicators' identification and analysis of the local conditions and gaps in existing NBS identification led to the creation of a knowledge space for all sites in FR and Follower Cities and cross-work package collaboration and demo-site requirements prioritization system
- Advanced guidelines for participatory processes to include setting the role of the euPOLIS project and partners in the city, defining the stakeholder groups, and designing and implementing the participation process.
- Holistic approach to urban planning and impact



assessment consisting of a three-layer approach which includes: (1) a multidimensional evaluation indicator framework, (2) integrating the relevant evaluation indicators into a Livability model, and (3) Establishing a social sustainability framework focusing on characteristics of the local community to embrace and uphold the NBS interventions and ensure long-term sustainability of the solutions.

- Creation of the GDPM for the interventions identification in FR cities with the definition of the design process and consensus platform creation among different stakeholders.
- Optimized combination of MF NBS interventions - maximize benefits in all aspects using modeling and professional advice.
- Collaborative NBS monitoring: volunteers for wearable, citizens able to tackle local conditions at all times.
- Combination of multiple monitoring approaches covering social, environmental, PH&WB, and economical aspects: permanent sensors, standalone sensors, wearables, field surveys, and questionnaires.

Methodological framework based on readily available data providing a quick assessment by quantifiable analysis, beyond solely based on subjective criteria & best practices.

- Appropriate (user-friendly) decision support methodology & tool for preliminary selection of effective NBS, scoring & ranking NBS, prior to detailed analysis/modeling.
- Innovative (BSoA) approach to storytelling: The Power of togetherness, talking to people to empower change.

With all the above-mentioned aspects, this issue of the euPOLIS magazine aspires to anchor the projects' core values into real-life societies and the ecosystem of similar NBS-inspired endeavors, showing the progress on the field as well as tackling one of the most important and game-changing aspects of the euPOLIS approach: citizens' point of view, the atmosphere among the neighbors in the demo sites, media influences and other stakeholders-decision-makers relations that affect the project implementation.

The euPOLIS Vision: Improving Well-being with Nature-based Solutions

AUTHOR:
Eftychios Protopapadakis

The adverse effects of urbanization have taken a toll on people's mental and physical health, here's how co-design and nature-based solutions can lead the way in mitigating these risks.

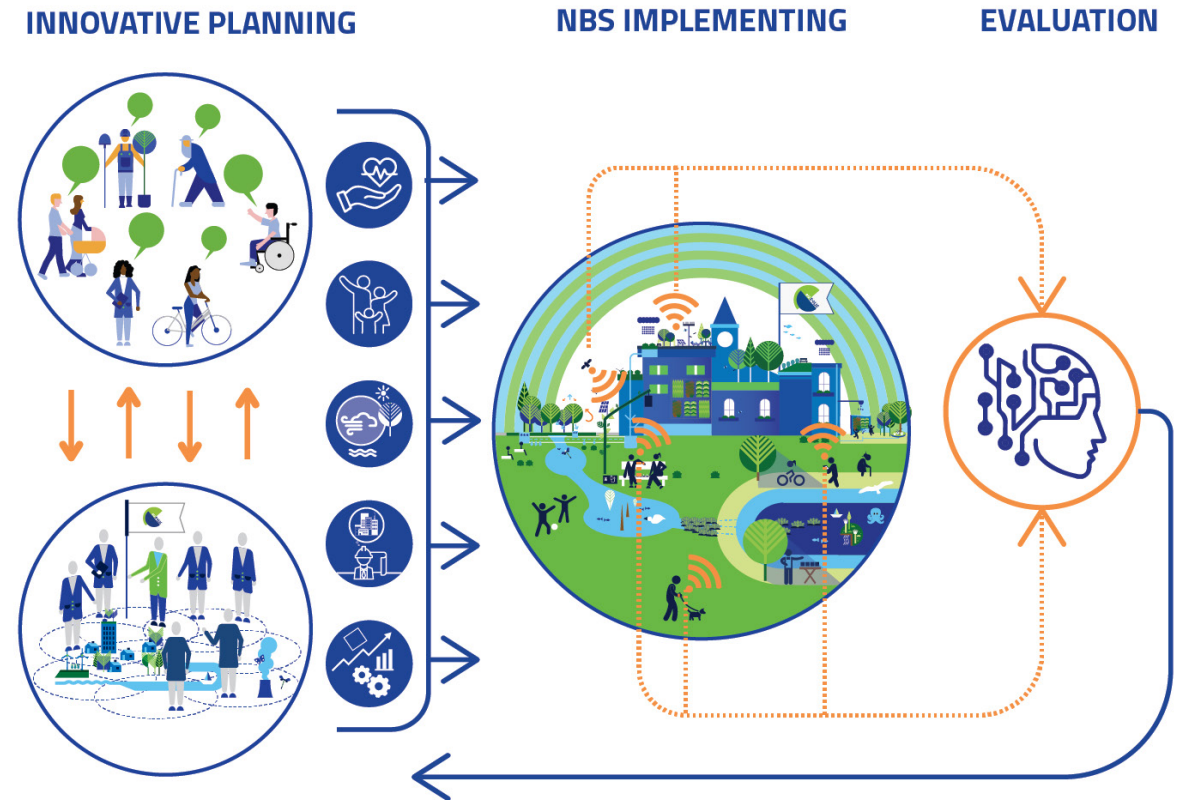
Back in the 1800's people started moving from rural to urban areas. This urbanization process was motivated by many factors, including better education, housing, access to work, and less time and expense of commuting and transportation. For many years, an increasing trend of urbanization was observed, followed by set of harmful phenomena, such as alienation, increased cost of living, and mass marginalization. Today, we are facing the consequences that emerged.

Urbanization is affecting the mind, body, and soul. The adverse effects of urbanization took a toll on people's mental and physical health. On the one hand, mental health is affected by stressors and factors, such as overcrowded and polluted environments, high levels of violence, and reduced social support. On the other hand, urbanization is associated with an increased risk of asthma, due to exposure to air pollutants, such as nitrogen dioxide (NO₂) and carbon monoxide (CO). Both cases require prompt actions/solutions.

However, it is not easy to accept that there are cost-effective solutions, which simultaneously provide environmental, social, and economic benefits and help build resilience. If we add that these solutions are inspired and supported by nature, people will reject the concept as a non-feasible idea. Fortunately, that is not the case. Nature-based solutions (NBS) is exactly what is needed to tackle most of the problems raised by increasing urbanization trends.

Addressing urbanization via nature-based solutions

The euPOLIS project addresses the challenge of targeted nature-based small-scale interventions. Usually, before taking any action to handle a situation, someone would start gathering related information. Yet, information implies participation, emphasizing on the residents or shopkeepers located close to the areas of interest. Attention should be provided to gender, age, and disability



perspectives within the process. At the end of the day, the planned NBSs should be accessible to everyone.

The creation of inclusive and accessible urban spaces dictates to systematically implement gender mainstreaming strategies. It, also, promotes the adoption of novel participatory tools, into all phases and processes of project development. This is to ensure that the needs of diverse groups are considered. If you provide people with pleasant socializing open areas, which stimulate social exchange, an improvement in lifestyle will be the outcome. Yet, the creation of such an area calls for the active participation of the citizens in the planning process.

Keeping in mind local, human need

Generally, participatory processes should be tailored to local needs and context, promoting a human-centric planning. The challenge lies in

successfully gathering the views of the multiple social groups, including marginalized people, which are, by definition, largely absent in public forums. Bringing these people and perspectives into planning processes is not a straightforward task. Participatory research is one way that these perspectives can be articulated, through the deployment of a range of research techniques.

Building an ecosystem that addresses residents' needs, can be sustainable, and abides to the constraints of the local climate, is a challenging task that requires information exchange, at all stages of the process: a) preparation, b) construction and c) utilization. In each stage, people can provide insights and ideas that will help with the process and probably, maximize the impact of the intervention. Citizens' participation will help co-design the interventions and monitor the integration process. The latter case can be involved in a co-evaluation process.

Giving back the power to residents in urbanized areas

In euPOLIS, we see public participation as an opportunity for building not only nature-based solutions that match the diverse needs of local communities but also for building social capital and consequently increasing social cohesion. However, to reach both goals, it is necessary to plan and execute public participation that is inclusive for diverse groups of citizens, easy and accessible for all stakeholders, based on two-way communication, and gives decision-making power to the citizens, and foremost is part of the long-term strategy that promotes citizens' participation.

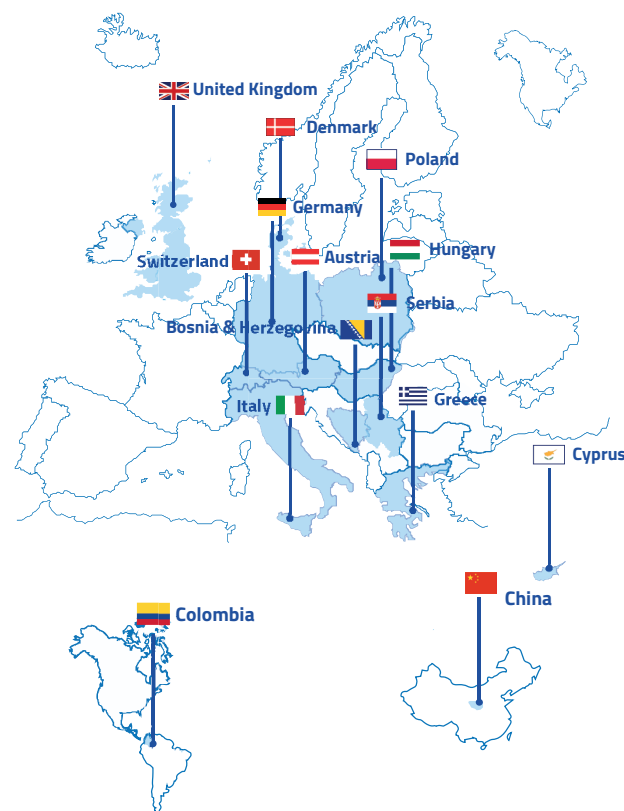
Furthermore, the project includes the monitoring and assessment of the impact of all interventions. Generated knowledge will be used for model calibration, NBS evaluation, interactive modeling visualization and web-based dissemination/communication activities. The goal is to complement the monitoring of the carried-out interventions. Citizens, city authorities, policymakers, psychologists, sociologists, and communication experts will be engaged during the adaptation of the euPOLIS solutions to ensure it is practical and user-friendly while respecting all relevant privacy issues.

Data and monitoring of outcomes

Data can be obtained through sensor networks, wearables, surveys, websites, and remote sensing. Each of these data sources has a specific contribution. There will be weather stations and pollution (or other type of) sensors installed at the intervention areas, complemented by satellite imagery. Data collection will, also, involve a group of volunteers. EuPOLIS will provide them with wearables, which will be used for monitoring

their emotional status, stress/anxiety levels, and physical health indicators.

The progress and the outcomes of introducing specific regenerative measures, as primary planning criteria, will be constantly monitored, allowing the involved parties to keep track of the goals, and adjust their strategies when necessary. The adopted approaches will be evaluated in four cities around Europe, namely: Belgrade (Serbia), Gladsaxe (Denmark), Lodz (Poland), and Piraeus (Greece). The know-how is, already, propagated in other cities, including Bogota (Colombia), Limassol (Cyprus), Palermo (Italy), and Trebinje (Bosnia and Herzegovina).



EuPolis partners map





euPOLIS Legacy Across European Borders

Bogotá - Colombia

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Bogotá City holds significant importance as a political, economic, and cultural hub within Colombia. Situated on the elevated plateau of the Andes, the city benefits from a unique geographical location that seamlessly blends nature and urbanism, creating a harmonious environment that encourages social interaction with the natural surroundings. With its diverse population of visitors and residents, Bogotá offers a comfortable and well-rounded living experience. The city's mountainous setting maintains a moderate temperature range of 10°C - 18°C, accompanied by a bimodal rainfall pattern, which provides an enjoyable livelihood for its more than seven million inhabitants.

However, ensuring the well-being of its inhabitants comes at the cost of approximately 11,421,724 tons of CO2 equivalent emissions. Bogotá also faces a considerable risk because of climate change, particularly in water resource management and food security, and facing a medium risk for public health, biodiversity, and ecosystem services (IDIGER, 2020). As a result, in the past decade, city planners have become increasingly concerned about ensuring

proper living conditions for their citizens, given these challenges.

In 2021, the Mayor's Office transformed the Urban Development Plan by establishing a new roadmap for Bogotá's urban and rural development, setting a fresh vision. It contains policies, regulations, strategic projects, programs, and indicators relevant to the below areas: ecological structure, public space, public transport, housing, and public services. As urban development principles, this plan integrated: **(i)** the adaptation to climate change through the increase of permeable areas and the city's greening, **(ii)** the ecosystem connectivity of environmental importance areas, **(iii)** the economic revitalization, and **(vi)** a citizen-oriented approach to enhance their health and well-being. With this plan, the local government aims to create a sustainable, resilient, regreened, and inclusive city for its citizens, so they can enjoy a high quality of life and fully develop their potential, offering improved housing, mobility, and public space facilities while embracing environmental sustainability and social inclusivity.

In this context, the euPOLIS Project, funded by the European Commission, offered a valuable opportunity for the city to enhance its urban planning tools and create a more resilient and inclusive urban environment. In the project, Bogotá is among the group of follower cities, learning from the experiences of the demonstration cities. However, being the only partner from South America implies different challenges and requires a dynamic view of the project's approach to addressing local needs. Consequently, Bogotá's team has developed different activities to embrace and promote the euPOLIS philosophy.

During the project's first year, a crucial step in promoting the implementation of Nature-based Solutions (NbS) in the city was identifying stakeholders. Bogotá's team recognized

that integrating the concept of NbS into the stakeholders' daily lives and discussions was a key starting point for fostering their adoption. To achieve this objective, a dissemination strategy was devised, which included the development of three online webinar sessions open to the public. The first webinar titled **"Seeking the City's Well-being – 5/10/2021"** began with the presentation of two case studies showcasing the progress made by two capital cities in mitigating the adverse impacts of pollution, managing urban space, addressing conflicts between vehicular traffic and pedestrians, promoting mixed land uses, and managing surface water, among other topics. The second webinar **"Towards a Model of the Sustainable City – 4/11/2021"** was focused on the euPOLIS-related projects being developed in Colombian cities.





Lastly, the third webinar **“Healthy Cities: A Right for All – 27/01/2022”** delved into the topic of health effects on citizens living in cities. Collectively, these webinars attracted 479 participants from academic institutions, public organizations, social civil groups, and non-profit organizations.

During the second year of the project, Bogotá’s team implemented a more direct approach to educate the city stakeholders about the benefits of NbS and its potential for implementation at the urban level. **The first euPOLIS workshop** was developed with the main stakeholders and citizens. The event seeks to create a space for education, interinstitutional interaction, and discussion about NbS initiatives in governmental, non-governmental, and civil society groups. From this perspective, the workshop presented how public

and private entities have implemented NBS over time and made visible the NBS implementation led by the citizens to understand their motivations, the process they have developed, and their successful experiences (see Figure 1).

As a result, the first workshop promoted the creation of institutional connections between organizations that construct NbS, which support the urban planning process and the adoption of technical standards for their implementation. Additionally, it facilitated the identification of local organizations that have been successfully implementing NbS in their specific contexts for over 10 years to achieve sustainable development in their neighborhoods and improve citizens’ well-being. Also, the results helped to recognize the significance **of employing creative and innovative approaches to establish effective**

communication channels with citizens.

According to the result of the first workshop, Bogotá’s team designed two types of on-site empowering activities (**euPOLIS Bicycle Ride and Walking Tour**) that engage citizens through physical activities, serving as a direct means of interaction with the community and nature. The first empowering activity, the **euPOLIS Bicycle Ride**, was developed in Bogotá’s case study known as El Reencuentro. This urban development zone holds significant cultural and economic value for citizens and connects the south and north of the city (see Figure 2).

The euPOLIS Bicycle Ride was organized for participants from various institutions, such as academia and local government entities, with the aim of acknowledging the environmental, cultural, and social significance of the territory. The main objective of this activity was to

highlight the importance of implementing NBS to enhance the quality of urban spaces. A total of 30 participants took part in the event, riding their bikes through the streets of the case study area while learning about its cultural, natural, and historical significance (see Figure 3).

The euPOLIS Bicycle Ride event received a positive response from the stakeholders, leading to the organization of a second edition beyond the project case study. On May 5th, key stakeholders from academia and the local government participated in a **Walking Tour at the San Juan de Dios the (CHSJD).** This event aimed to **recognize the reactivation and greening strategies implemented within the framework of NbS in different heritage and natural areas of CHSJD, to promote well-being and public health.**

The walking tour served as the second event of this new and innovative stakeholder workshop



format, ensuring active citizen participation in Bogotá. Over 50 participants joined the tour to gain a deeper understanding of the cultural value of the location and the significance of preserving CHSJD's natural elements (see Figure 4).

The legacy of the previous activities revealed the **importance of establishing a one-on-one channel of citizens' communication and promoting a permanent relationship with citizens.** For this reason, Bogotá's team designed a bottom-up approach, which implemented a mobile information point in *El Reencuentro*, that promotes civic engagement and contributes to project appropriation (see Figure 5). Inside the mobile booth, an expert explains the renewal project to the citizens and answers their questions about the scope of the project and the neighborhood's transformation through NbS and other strategies. Until the middle of March, the number of visitors was up to 30 citizens per day. The visitors were mainly older neighborhood residents, and the questions received were related to public space transformation and the project's influence on social and environmental principal concerns.

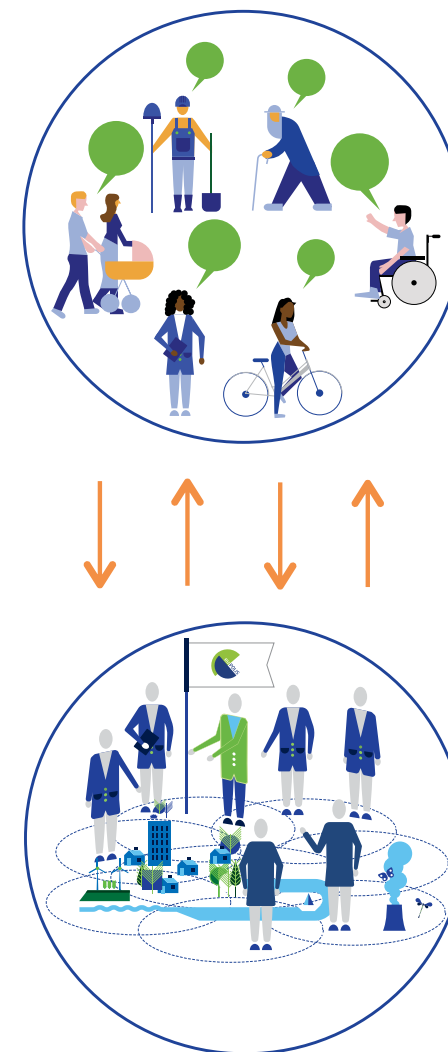
The massive message of support of the mobile point promoted the initiative to complement the mobile point perception analysis with a questionnaire campaign on-site **to understand the local citizen's perception and evidence of the priority zones for NbS implementation and the main concerns.** The campaign started in April-2023 and was designed from the guidelines of the euPOLIS social team members. To date, 100 surveys have been implemented, and 2 interviews and it is expected to implement 400 surveys on the site to consolidate a final diagnosis of the priority zones.

During the last three years, in addition to conducting workshops and implementing strategies to empower stakeholders, the euPOLIS

team in Bogotá has actively participated in 14 scientific events, including prestigious international conferences such as the International Congress on Urban Drainage (ICUD), the International Association for Hydro-Environment Engineering and Research (IAHR) and the International Water Association (IWA) world congresses, and the Novatech conference. The Bogotá euPOLIS team also developed 1 scientific publication entitled *A SUDS Planning Decision Support Tool to Maximize Ecosystem Services* (Uribe-Aguado et al., 2022) in which part of the euPOLIS philosophy was implemented in *El Reencuentro* case study. This involvement has allowed the team to extend the euPOLIS philosophy beyond national boundaries and showcase the outcomes achieved through its implementation in the local context. In addition, 10 undergraduate internship students at Universidad de los Andes actively participated in the project through the development of different activities such as interviews, questionnaires implementation, and the development of dashboards and indicators. The latter allowed us to create an academic euPOLIS community and disseminate the euPOLIS philosophy to future generations. These three years of experience allowed us to conclude that for the city, euPOLIS is more than a project; it is a powerful tool for transforming the social and economic landscape of the city, improving the provision of the urban ecosystem according to citizen's needs and contribute to Bogotá's sustainable development goals. It has also served as a source of inspiration, leading to the creation of other innovative projects, and fostering a new understanding of public space among urban planners and stakeholders. The Bogotá euPOLIS team has emerged as a local reference for sustainable development practices and NbS within the local context.

The Civil City Framework for the Implementation of the Nature-Based Solutions

AUTHOR:
Mikołaj Biesaga



Under the Civil City Framework, we reconcile a city as commons, enabling collective action of city residents and cooperation between different local stakeholders for the common vision of healthier and greener urban spaces. This can be achieved by embedding a Penta helix approach of multi-governance in urban planning, based on a close interaction between five key stakeholders, including public authorities, industry and business sector, academia, civil society organizations, and individual citizens.

The vast body of scientific literature on Nature-Based Solutions focuses on their environmental benefits and how they might help to mitigate the effects of climate emergencies. For example, tailored and targeted actions help to restore biodiversity (Beninde et al., 2015), decrease temperature and pollutants concentration (Ascenso et al., 2021), reduce noise (Dzhambov et al., 2014), or help to manage sewage/gray water (Zhang et al., 2019). However, very often the designers and planners focus only on tackling these environmental challenges and, thereby, limit the multifunctional potential of NBS (Bozovic et al., 2017) which by definition should simultaneously be beneficial for both the local community and local environment.

In euPOLIS, we try to break with this routine. The solutions being developed under the project are designed and implemented in a manner that matches the needs of citizens.

The inclusion of citizens in the planning process increases their feeling of connectedness and agency, which apart from directly improving their well-being, ensures higher acceptance and long-term sustainability of such solutions. Moreover, various types of social participation, and social activities, in general, have been linked to lower mortality (Youn et al., 2020; Glass et al., 1999), better mental health (Takagi, Kondo, and Kwachi, 2008), and greater odds of seeking professional mental healthcare when needed (Vogel et al., 2008).

Participation and the capacity to exercise one's rights are important factors related to mental health. On the one hand, symptoms such as lack of energy, the feeling of social isolation, or low motivation may be negatively related to the ability



to fully enjoy citizen rights. For example, people who are depressed are less likely to benefit from leisure time activities or seek social interactions. They are also often unable to work and tend to avoid involvement in civic activities. On the other hand, depriving community members of the opportunity to participate in decisions about their environment can increase negative sentiments and lead to frustration, anger, or sadness.

Citizen participation in planning processes is important also because green infrastructure does not have the same benefits for all community members. A systematic review by Sreetheran and van den Bosch (2014) showed that the fear of crime in green spaces is a function of personal demographics, along with the physical attributes of the space (i.e., lighting) or the time of the day. Gender is the most predictive determinant here, together with belonging to an ethnic minority. Therefore, the design of the space must take into consideration not only directly health-related effects for 'the average Joe' but also consider the needs of various groups of users whose voices are often marginalized, i.e., women, elders, minorities, migrants, and minors. That is especially important because access to well-maintained green spaces can help reduce the socio-economic inequalities in physical and mental health (Mitchell et al., 2015).

In euPOLIS, to integrate local environmental, health-related, and socio-economic challenges we use the Civil City Framework (Domaradzka et al., 2022). It is directly related to United Nations Sustainable Development Goals 3 (Good health and well-being) and 11 (Sustainable cities and communities). Moreover, it is in line with European Commission priorities as described in the Green Deal policy (European Commission, 2019) with the overarching aim of making the European Union climate neutral by 2050, as well as the recently developed New European Bauhaus initiative, which brings together citizens, experts,

businesses, and institutions to ensure more sustainable living.

The Civil City Framework underlines the importance of the citizens' engagement and responsibility for co-designing and planning the sustainable future of our cities (Domaradzka & Wijkstrom, 2016). While we recognize the crucial role of public and private stakeholders in shaping urban development, we underline the need for realigning those local policies with the concept of public health as a common good (D'Apice & Sarli, 2022). A healthy urban environment has clear long-term benefits for the majority of local actors and, as such, has the potential to become an axis of the Penta helix multi-stakeholder engagement. It aims at integrating multi-governance in planning processes and is based on a close interaction between five key stakeholder groups, including public authorities, industry and business sector, academia, civil society organizations, and individual citizens (homeowners, residents, commuters).

This coalition should ensure that the process of developing and implementing pro-health interventions will be accompanied by grassroots participatory engagement. As health risks remain high on the agenda of most urban residents, this should drive high participation in discussing the main health-related needs and problems encountered by the local community. Apart from in-person meetings and strategic workshops, different forms of data collection are necessary to enable better planning as well as impact assessment. The Civil City Framework research toolbox includes questionnaires, individual and group interview scenarios, observation guidelines, and spatial audit forms. Additionally, the data collected through health monitoring applications, wristbands, and other personal sensors, can be integrated with survey data to enable triangulation.

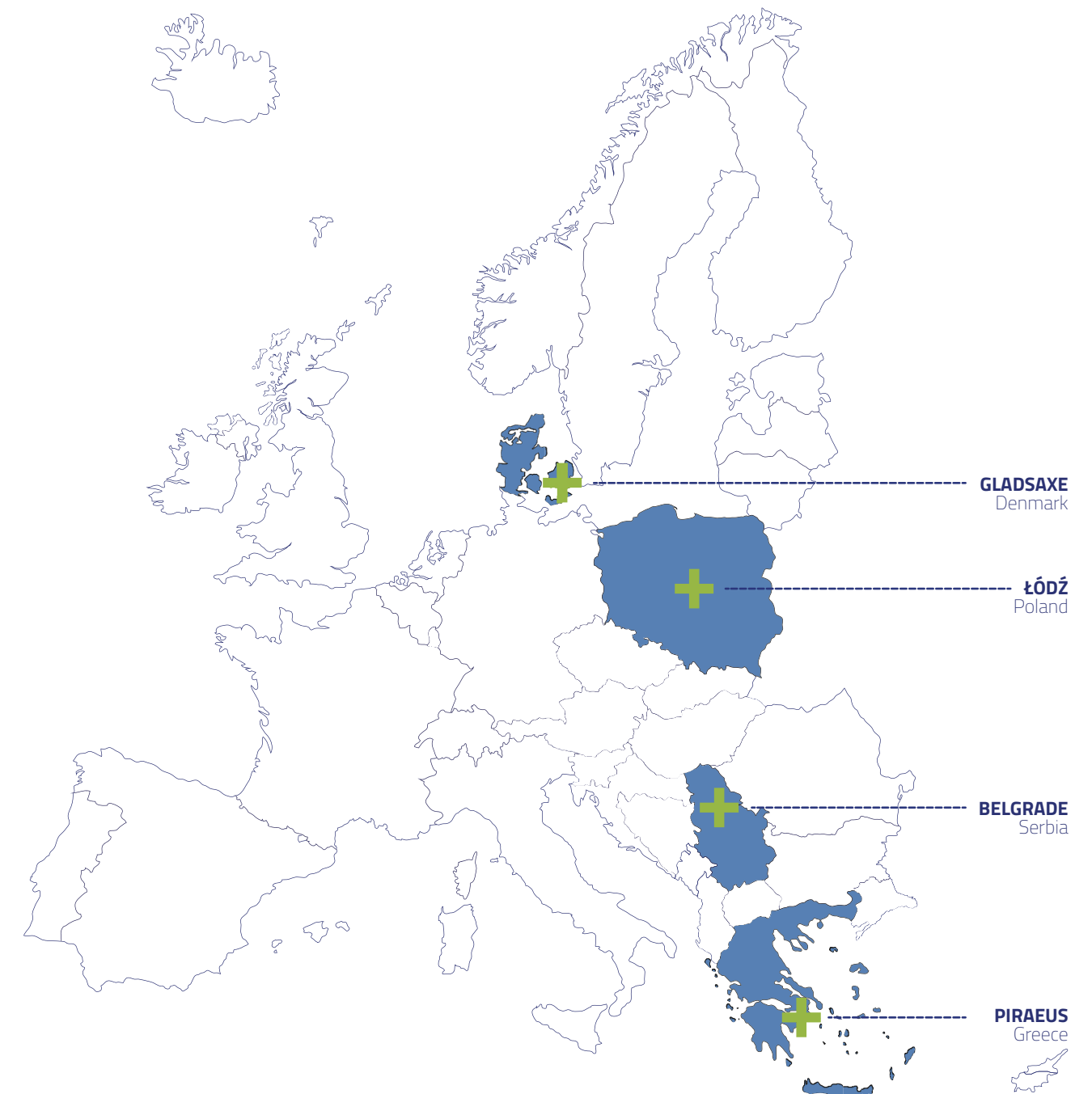
While the stakeholder's coalition should focus on the specific area and how to upgrade it to provide better living conditions, a much wider alliance on a global scale is needed to ensure that all can benefit from it. As Mayer (2020) aptly points out, as researchers, we need to get involved in emerging partnerships where planners, professionals, academics, organizers, and advocates collaborate with community networks and movement activists to transform our cities, not merely upgrade them.

This is what the civil-city approach strives to do, by presenting a holistic approach to preparing, conducting, and evaluating urban investments. In this, we employ frameworks and experiences from a growing number of research projects that range from studying smart cities from a right to the city perspective, through monitoring NBS implementation, to evaluating citizen science projects and operationalizing social sustainability measures. We critically observe smart-city implementations as those which could greatly benefit from the right to the city approach to correct the course of urban development, so it does not blindly implement technological novelties. Applying the right to a healthy city framework allows the same innovations to empower the citizens while informing better planning and urban policies.

We believe that the complex challenges that the cities face right now require an analytical approach, based on a theory-driven empirical toolbox and value-driven implementation and evaluation framework. We call this Civil City Framework (Domaradzka et al., 2022) to underline the central role of citizens and civil society structures in ensuring that urban development takes a new course.

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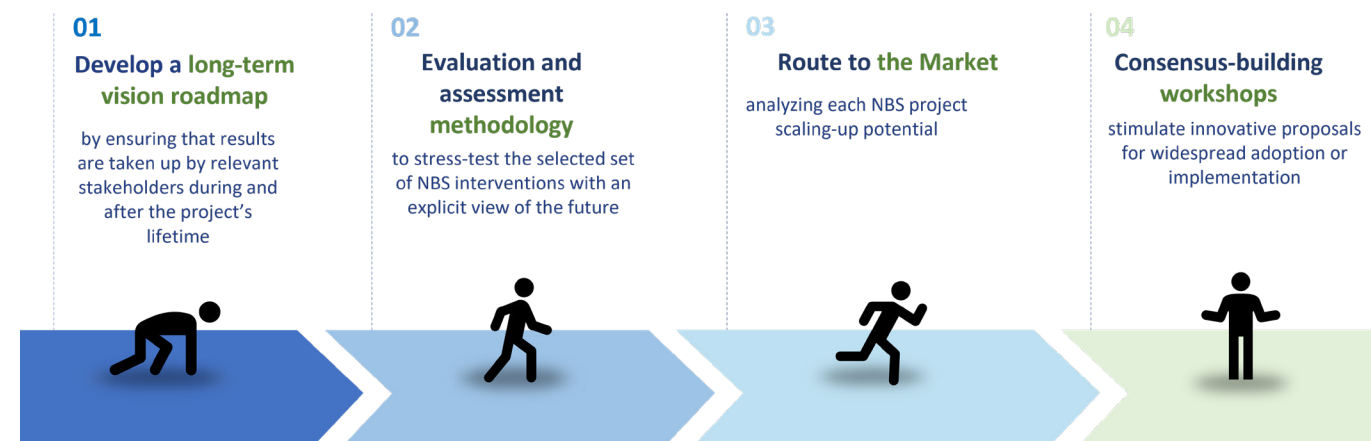
EuPolis front runner cities living labs map

Nature-Inspired Solutions' Route to the Market

AUTHORS:

Eirini Marinou, Betty Charalampopoulou

The euPOLIS Route to the market strategy is a great chance to connect the Small and Medium-sized Enterprises' priorities with the priorities of the cities, create new business opportunities, discover innovations, and interact with the market.



Aiming to alter the urban planning paradigm and switch to a health and people-centred planning matrix, euPOLIS constantly develops and upscales new technologies, products, and services. Putting **people's health and well-being** as the core values of its methodology, one of the main goals for the euPOLIS experts is to make this methodology widely available and accepted among professionals, decision-makers, and citizens. To achieve this, those products and services must not be the privilege of the few, but available on the market. The goal is to be able to provide knowledge and experience to the widest

range of users, by establishing and recognizing the sets of products applicable to various environmental and social conditions, even beyond the project duration. Especially beyond it.

The euPOLIS experts are identifying sound business models, replicable to other markets, and developing new resource activation techniques and ways to scale up Nature-Based Solutions (NBS). This will support a **gradual transition to a leading market position** for the euPOLIS project, moving it to the forefront of the NBS and the Blue Green regeneration. A common and efficient

strategy for exploiting the project findings is aimed at being developed, not only individually but also in collective ways, to ensure that these are taken up by the relevant stakeholders during and after the project's lifetime. The Exploitation Strategy is a comprehensive description of the relevant activities that have taken place so far as well as those that are planned, to ensure **the Exploitation and Business Plan-Development** of the euPOLIS results beyond the end of the project, focusing on the preliminary strategies to be followed and the identification of key assets for exploitation. euPOLIS solutions will be demonstrated in four European cities: Belgrade, Lodz, Piraeus, and Gladsaxe. Four follower cities (Bogota, Palermo, Limassol, and Trebinje) have also been included to replicate and demonstrate the advantages of the euPOLIS innovations via mentoring and coaching. During the development of the euPOLIS exploitation strategy, extensive research has been conducted to gather valuable insights. It is worth emphasizing that all the efforts have led to the establishment of comparative advantage over alternative urban development methods, primarily due to the focus on scientific and technological excellence.

Exploitation needs **interaction with the end users and potential customers** which so far took place mostly in remote/digital form due to the pandemic and other circumstances. During this period, interest and demand have dropped significantly and remain uncertain. This period's circumstances provided us with a unique opportunity to holistically re-evaluate the exploitation actions, where euPOLIS can be promoted as a solution, how it can be valuable, and how these and customer behaviours may change. Those activities include Operational resources (e.g., remote collaboration tools), expanded coordination, and personalized support for partners and customers, thinking as key enablers of data sharing. The "beyond the state-of-the-art" contribution of this method includes the creation of detailed

online questionnaires provided to the end-users, to re-evaluate their needs and ensure valuable feedback on the overall process.

This procedure outlines the range of the exploitation actions that took place and the ones that are scheduled within this project to capitalize on the knowledge developed and the utilized technological advancements, as well as for bringing the value generated to both market and society. These activities are a great chance to **connect the Small and Medium-sized Enterprises (SMEs) priorities with the priorities of the cities, create new business opportunities, discover innovations, and interact with the market.**

The plan consists of using the **EU tools** for exploitation according to the dissemination and exploitation obligations and opportunities beyond the end of the grant duration. euPOLIS results will be promoted via the:



• **Horizon Results Platform (HRP)**, a matchmaking tool allowing you to publish the Key Exploitable Results to promote them vis-à-vis your targeted audiences – investors, stakeholders, policymakers, potential business partners, etc. The euPOLIS results will be supported with a one-page exploitation brochure, with some key technical points describing the euPOLIS products/solutions showing the impact of euPOLIS



Furthermore, several **Exploitation Workshops for the consortium** have been organized to prepare the exploitation strategies of the project results; these workshops also monitored potential intellectual property rights (IPR) opportunities. They provide a final strategy for the IP exploitation “after the project” phase. The results of these workshops will feed into the overall exploitation and business plan. Additionally, some key parameters from socioeconomic aspects e.g., job creation, effects on GDP, and import/export will be analyzed based on the whole value chain.

Workshop no1 under the title “Definition of Exploitable Products” took place in January and the main focus was on acquiring interactive knowledge and exploring the exploitation potential of euPOLIS results.

Workshop no2 under the title “Definition of the Optimal Market Approach” was organized in March.

Workshop no3 under the title “Definition of the Formalities for a Joint Market Approach” will be held after the implementation of the Horizon Results Booster Workshop, because is very important for its results to be fed into workshop no3.

Alongside the HRP, it is expected the use of the upcoming **HRP TV website** as informative audio-visual material on various topics, e.g., preparation for meeting investors, management of Intellectual Property, etc



Moreover, euPOLIS will be endorsed via the **Horizon Results Booster (HRB)**, a free consulting service, which includes clustering of projects for common dissemination, enhanced exploitation plans, business plans for Research & Innovation (R&I) results, and commercialization services for the more mature results. Horizon Results Booster is a new package of specialized services to maximize the impact of R&I public investment and further amplify the added value of the Framework Programs (FPs). It provides a continual stream of innovation to the market and beyond. **This workshop is organized for the 5th and 6th of July**

Mainstreaming Innovation - The euPOLIS Solutions and Transfer of Knowledge

AUTHORS:

Sotiria (Sandra) Baki, Athanasia Kazantzi

A simple, yet systematic, methodological framework is proposed, to facilitate a first-order NBS selection process (Baki et al., 2023). The framework is founded on a rational site-specific, multi-dimensional ranking of the NBS, rather than on a purely subjective identification of the most efficient NBS built solely on account of past good practices. The proposed innovative methodology consists of two distinct steps. The first step mostly exploits readily available data and expert knowledge to deliver an initial site screening via estimating appropriate indicators that account for the site performance in a spectrum of issues/ concerns. The second step involves the assessment of the capacity of a set of candidate NBS, considered for the site of interest, to impact/mitigate the most pressing site-specific problems.

Nature-Based Solutions (NBS) are described by the European Commission as actions that simultaneously address environmental, social, and economic aspects to maximize nature benefits. The interest in upscaling urban environments via NBS resulted, during the past decade, in an ever-increasing demand for structured methodologies and efficient urban design tools to facilitate their adaptation to standard urban policies, plans, and everyday practices. Voskamp et al. (2021), for instance, provide an extensive overview of currently available tools (including methodologies,

software, catalogs, repositories, and e-platforms) aiming to support the implementation of NBS in cities. Towards this direction, euPOLIS, in line with the NBS definition offered by the European Commission, developed and eventually offered to urban planners and policy makers, a multi-dimensional, indicator-based preliminary NBS assessment framework for enabling a first-order site-specific selection of NBS. Identifying the most suitable NBS interventions for enhancing an urban ecosystem is far from being a trivial task.



Summary site screening results for Akti Dilaveri, Piraeus (euPOLIS Front Runner city)

An App for Urban Planners

The proposed framework is offered to urban planners in the form of an online application, to serve as a decision-assisting tool for undertaking a first-order NBS selection and consequently prioritizing further investigation and detailed modeling to appropriate NBS prior to their implementation in an urban site. To the authors' knowledge, although both the indicator-based methodologies for undertaking a site screening, as well as the capacity of several types of NBS in reducing the impact of certain problems, have been addressed in past research studies, no similar practical framework, like the one proposed by euPOLIS, which combines two key aspects (severity/impact) for enabling a site-specific multi-dimensional ranking of the NBS is currently available in the form of a practical tool. ||

The identification of the optimal solution or spectrum of solutions should account for at least (a) the specific multi-dimensional challenges/problems faced by the urban site of interest, (b) the ability of each NBS to mitigate the faced problems, (c) the in-depth knowledge of urban planners and other experts for the local conditions (considering

the potential hazard aggravation due to Climate Change), as well as the opinion/preferences of the citizens/stakeholders and (d) the budget and any other pertinent constraints (e.g. existing regulatory framework) that might prohibit or limit the efficient implementation of certain NBS.

On account of the above, a simple, yet systematic, methodological framework is proposed herein to facilitate a first-order NBS selection process. The framework is founded upon a rational site-specific, multi-dimensional ranking of the NBS, rather than on a purely subjective identification of NBS, that might be beneficial to an urban site and its users, yet is solely built on account of past good practices. The proposed innovative methodology consists of two distinct steps. The first step of the proposed methodology mostly exploits readily available or easily acquired data (at the closest possible proximity to the location where the planned NBS interventions will be implemented), as well as expert knowledge where necessary. This process effectively delivers an initial site screening (baseline assessment) through the estimation of appropriate indicators that account for the site performance in a spectrum of issues/concerns that could be associated with one of the following

categories: (a) Public Health and Well-Being (PH&WB), (b) Urban, (c) Environment, (d) Social and (e) Economic. In particular, urban planners are initially requested to perform a qualitative site assessment to define the site performance across a persistent list of several concerns, representing critical issues, that have been identified within each of the aforementioned categories, and that could potentially be addressed/mitigated with NBS interventions. However, although the assessment for specifying the severity of a particular concern (e.g., air quality, percentage of overweight population) is offered in the form of High/Moderate/Low/Not a problem/Not a concern (the latter applicable to those concerns that are not possible to be affected or not of interest to the specific site under any likely circumstances), for each concern specific thresholds are offered to guide the decision of stakeholders with regards to the transition from one problem severity state to the other. It should be noted that these thresholds should rather be considered as recommendations, that however could be updated in the future in case that more data becomes available and/or if the level of knowledge in the field advances.

Once the site screening process is completed, the

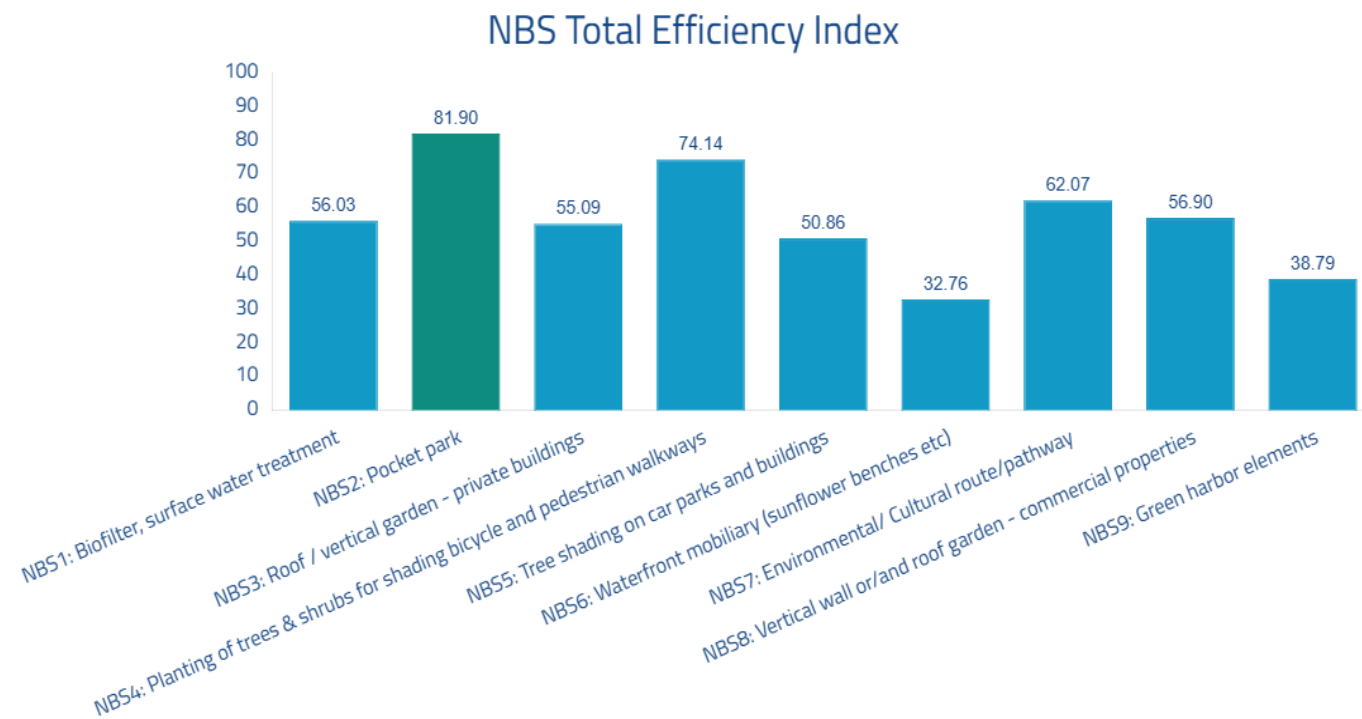
second step of the proposed methodology involves the assessment of the capacity of each candidate NBS that is considered for the site of interest (following ideally a participatory procedure) to impact/mitigate the most pressing site-specific problems. This NBS impact assessment, likewise the site screening, is once more performed in a qualitative manner. Hence, based on available literature evidence, experience, and expert opinion, the urban planners are requested to specify whether a specific NBS could have a Direct/Indirect/No mitigating impact/effect on a particular concern.

Completion of the second step essentially concludes the input stage of the proposed framework. The output stage is materialized via convolving the information related to the severity of the concerns (first step) with the ability of an NBS to impact them (second step). The simultaneous consideration of the concerns severity with the ability of an NBS to resolve certain kind of problems (e.g., pocket parks directly contribute to resolving the urban heat island effect), results in a site-specific ranking of the candidate NBS. Hence, for instance, an NBS will be ranked higher in the list, if sufficient evidence exists for its ability to improve the site performance in a specific

NBS Overall Performance

Scores	NBS1: Biofilter, surface water treatment	NBS2: Pocket park	NBS3: Roof / vertical garden - private buildings	NBS4: Planting of trees & shrubs for shading bicycle and pedestrian walkways	NBS5: Tree shading on car parks and buildings	NBS6: Waterfront mobiliary (sunflower benches etc)	NBS7: Environmental/ Cultural route/pathway	NBS8: Vertical wall or/and roof garden - commercial properties	NBS9: Green harbor elements
Environmental Score	76.32	84.21	82.89	84.21	76.32	21.05	55.26	92.11	26.32
Urban Score	83.33	100.00	30.00	83.33	66.67	33.33	50.00	33.33	33.33
Social Score	18.18	90.91	32.73	54.55	36.36	54.55	68.18	36.36	36.36
Economic Score	50.00	10.00	36.00	20.00	0.00	20.00	10.00	40.00	60.00
PW & WB Score	50.00	88.24	52.94	88.24	41.18	35.29	85.29	44.12	50.00
Overall Score	56.03	81.90	55.09	74.14	50.86	32.76	62.07	56.90	38.79

Performance and ranking of candidate NBS in Akti Dilaveri, Piraeus



problem domain, in which the site is performing poorly, compared to another NBS which, for instance, may be extremely efficient in mitigating several problems that however are found to be of either no or low severity at that site, in view of the baseline assessment findings. In the extreme case that an NBS addresses only concerns that are of no relevance to the site of interest, then the methodology identifies that no benefit is stemming from its implementation at the site of interest.

To enable the convolution of the two factors that determine the site-specific contribution of each NBS towards resolving the problems faced by the urban site of interest, each of the qualitative descriptions in both steps was associated with a score. Multiplying the score associated with the problem severity for each concern with the score related to the ability of a particular NBS to mitigate this problem, essentially results in an overall score that reflects a site-specific NBS score/value. Hence, the higher the problem severity and the bigger the ability of an NBS to mitigate this problem, the higher the score of this NBS in this particular problem category. Adding up these contributions for a specific NBS provides estimates for the per-concern category as well as

for the per-site contribution (overall score). The outcome of this process is a list that ranks the potential NBS on account of their overall score. Yet, the developed framework could accommodate supplementary information to further assist the decision-making, such as budget constraints that might prohibit an otherwise efficient NBS from being implemented or a preference for resolving a certain (usually of high severity) problem (“top priority problem”) against other ones (e.g., on account of Climate Change projections suggesting that certain problems may be intensified in the future, or on account of the social fabric in the region).

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Planning Greener Cities for People

AUTHORS:

Alfred Figueras Anton, Frida Seidelin, Alix Aliaga

Innovation does not only consider urban design, as it also includes the communities living in and around the project demonstration sites. euPOLIS creates a “blend-in matrix” which allows investigation and activates multifaced intersections between new development and neighborhood. In other terms, apart from direct NBS effects on Public Health (PH) & Well-being (WB), numerous cultural/social cohesion and interchange are expected (e.g., urban farms, socializing space, green schools, etc.).

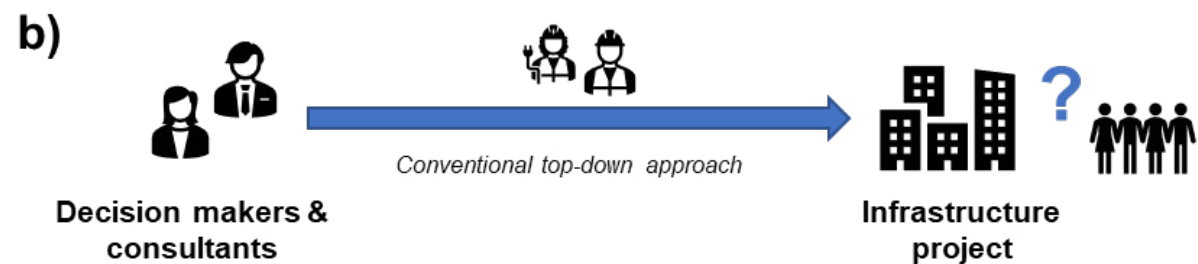
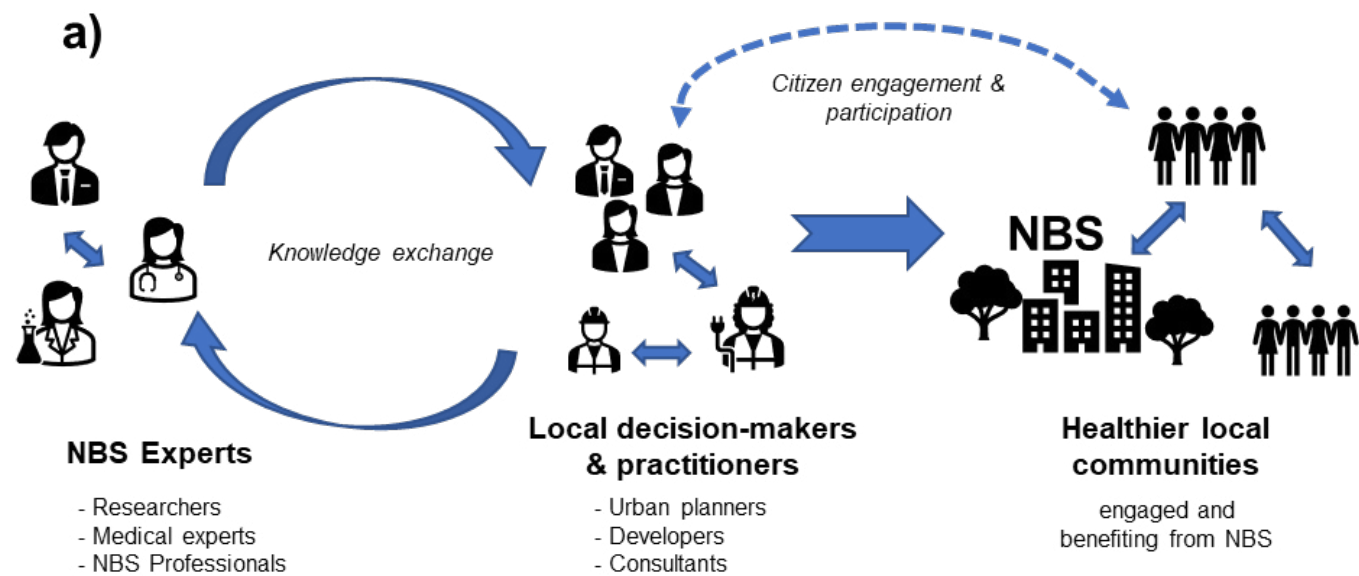
Cities give us a lot of opportunities; however, hyper-urbanization takes its toll on our health and well-being by increasing flood risk, noise, and air pollution, causing habitat and biodiversity loss. There are also social consequences such as social disparities, health inequalities, increased crime, and anti-social behavior.

Integrating nature back into our cities can help to reduce some of these issues and create more healthy and enjoyable environments for us all to live in. For example, people who exercise in the natural environment at least once a week are half as likely to experience poor mental health compared to those that do not. As a result, we need a new way of thinking about city design, one where nature and people are at the center of urban planning.

The euPOLIS work undertaken in Work Package 7, aims to up-skill city planners in achieving the euPOLIS approach by coordinating the NBS

implementation in all front-runner cities. Another important step is the collection of data for validating the solutions. Each project site has already started preparing all the practicalities concerning the monitoring phase. The data collection together with the posterior data analysis will be important research tools and methodologies that will allow to withdrawal of evidence-based conclusions of the NBS benefits. In this way, the final objective is to generate evidence-based knowledge of the benefits of implementing NBS, and this is done by an exhaustive pre- and post-monitoring program.

The ambition of euPOLIS is to achieve progress in conventional urban planning. Specifically, the project will achieve improvement in the main areas of NBS urban design. Innovative methods, technologies, inter-disciplinary collaboration, and development of multifunctional NBS are the main drivers to reach this goal (Figure 1).



The euPOLIS innovative approach for urban planning and NBS Implementations compared to b) that illustrates the conventional top-down approach that many infrastructure projects have followed until now.

AMPHI together with task leaders from the University of Belgrade (FCEBG), Geosystems (GEOS), and PLEGMA LABS (PLEGMA) contribute to the overall coordination on implementation and monitoring of several innovation actions necessary to achieve progress in urban planning.

This multifunctional approach can be summarized by three beyond-the-state-of-the-art (Urban Master Planning of Cities, BGS/ NBS Implementation and Evaluation, Monitoring Systems for PH and WB), which in turn contain the innovation concepts:

1. Beyond-the-state-of-the-art in Urban Master Planning of Cities

euPOLIS utilizes effective urban planning tools to secure a radical change in planning results. In this context, a matrix of functional Interactions between urban components will contribute to identifying urban components' synergies. The matrix also considers economic aspects, by using a Cost Dependence Matrix (CDM). CDM helps to identify potential capital cost, running cost, and life cycle cost savings when synergies between urban components are implemented. Contrary to

Empowering Nature to Empower Communities

The success of NBS interventions will be evaluated through environmental, PH & WB, and social monitoring programs. Biodiversity surveys and environmental modeling, in combination with in-situ sensors and satellite imagery, will provide insights into the environmental status of the site. The use of wearables, health apps and on-site social studies, will help to determine the PH & WB of people. Finally, on-site questionnaires and other qualitative methods will help to shed light on the improved social conditions.

the planning phase. euPOLIS includes ESS as a planning mandatory criterion. ESS, produced by NBS, (e.g., removal of air pollutants, enhanced biodiversity, reduced noise pollution, increased rainwater retention, more comfortable public green spaces etc.) will revitalize the urban ecosystem and by doing so, it will regenerate the economic, social, and cultural aspects of the site. Finally, this process is expected to improve PH & WB directly/indirectly in all the demonstration sites.

the standard urban planning practice, that would usually ignore the potential savings related to components interactions.

Innovation does not only consider urban design, as it also includes the communities living in and around the project demonstration sites. euPOLIS creates a "blend-in matrix" which allows investigation and activates multifaced intersections between new development and neighbourhood. In other terms, apart from direct NBS effects on Public Health (PH) & Well-being (WB), numerous cultural/social cohesion and interchange are expected (e.g., urban farms, socializing space, green schools, etc.). The above-mentioned follows the so-called "Gender-related planning criteria". This concept refers to considering gender equality as regular planning criteria, which so far has been rarely done in standard urban planning. To sum up, equality within different minorities (e.g., elderly, kids, other ethnicity, refugees, disabled, etc.) must be achieved through the euPOLIS Urban Planning approach.

3. Beyond-the-state-of-the-art in Coaching Systems and Social Entrepreneurship

An innovative approach will contribute to involving people and stakeholders in an ongoing discussion, from the very first stages of NBS design to the final phases, increasing stewardship and ownership of the space. This information exchange will contribute to breaking down barriers, gaining support from the public and the future users. euPOLIS will employ an innovative social media-based approach to support interactive communication and dissemination of the project concept.

NBS implemented in the project's sites will therefore cover a multi-disciplinary consortium, actively engage citizens and non-core stakeholders for consultation, and have a strong focus on PH & WB with the assessment of multiple co-benefits the solutions can provide. All will be done by combining multiple objectives (multifunctionality aspect). Pocket parks, waterways, vertical gardens, rain gardens for surface runoff quality, and provision of new canopy for socializing, are only a few examples of NBS selected for the project.

2. Beyond State of the Art in BG/NBS Implementation and Evaluation

In standard urban planning, NBS is frequently limited to spatial parameters. Using the conventional approach, ecosystem services (ESS) and benefits produced by NBS are often undervalued during

Enhancing Public Health in Cities: The Benefits of Nature-Based Solutions and the euPOLIS Project Case Study

AUTHOR:

Afroditi Mathioudaki

As urbanization continues to shape our world, cities face numerous challenges, including environmental degradation and public health issues. However, a growing movement towards nature-based solutions is emerging, recognizing the profound benefits of integrating nature into urban environments. These innovative approaches not only improve the quality of urban life but also have significant positive impacts on citizens' public health. In euPOLIS, we research and explore the advantages of using city-specific nature-based solutions in promoting our citizen's well-being and public health. The design and implementation of such innovative solutions do not always come easy and are naturally associated with significant challenges in engaging people and getting their trust from an early stage in the process, especially during times of health crises and high inflation, during which euPOLIS has been developing.

Some of those benefits are:

- Inhancements of Air Quality
- Mitigation of Heat Islands
- Alleviation of Mental Stress
- Promotion of Physical Activity
- Strengthening of Social Cohesion
- Enhancing Biodiversity and Ecological Resilience

Challenges – the euPOLIS experience

The euPOLIS project life cycle coincided with the COVID-19 pandemic, the crisis in Ukraine, and the significant rise in energy processes and shortage of materials. During a high-inflation era like the one we are currently facing, nature-based solutions face both challenges and opportunities. One of the major challenges is the rising costs associated with implementing and maintaining



these solutions. Inflation can lead to increased prices for materials, labor, and equipment, making it more difficult for organizations and governments to invest in nature-based projects. Additionally, inflation may divert financial resources away from environmental initiatives as individuals and businesses prioritize immediate economic stability.

Citizen engagement

This is one of the euPOLIS pillars and it plays a crucial role in implementing nature-based solutions in cities, but it also faces several challenges. One of the main obstacles is the lack of awareness and understanding among citizens about the benefits and importance of these solutions. Many people may not be familiar with the concept or its potential impact on their daily lives. Additionally, there can be a lack of trust and skepticism towards government initiatives, which

can hinder active participation and collaboration. Another challenge is the diversity of interests and priorities among citizens. Different individuals and communities may have varying needs, preferences, and levels of engagement, making it challenging to achieve consensus and ensure inclusivity in decision-making processes. Balancing the desires of different stakeholders, such as residents, businesses, and environmental organizations, becomes a complex task.

Applied in real life, our euPOLIS colleagues contributed to designing and implementing customized spatial solutions for each case study by creating a set of comprehensive and tailor-made communication tools and strategies to inform, engage, and provide feedback to both euPOLIS experts and local communities. Through several workshops with stakeholders, our experts informed the citizens about the euPOLIS methodology and values and mapped their



challenges, needs, and general knowledge about the impact of the design of public spaces on a variety of aspects, from health and well-being to social cohesion and business models.

Our local team in Belgrade initiated and conducted a student competition for the design of the eco-edu hub in the pocket park on Zemun Quai. Their solutions were based on the initial information gathered from the local communities. The winning designs were publicly showcased for additional comment and expression of needs and desires by the citizens. The design will be the result of building in the experts' knowledge, innovative euPOLIS methodology and technology, and the citizens' will.

We conducted all these in parallel with maintaining our online platform active and open to users to learn about the latest achievements, discoveries, and discussions around this topic.

Conclusion

Nature-based solutions offer multifaceted benefits to citizens' public health in cities. By integrating green spaces, trees, and natural elements into urban environments, cities can enhance air quality, mitigate heat islands,

alleviate mental stress, promote physical activity, strengthen social cohesion, and enhance biodiversity. These nature-based solutions not only improve the overall well-being of urban residents but also create more sustainable and resilient cities. Investing in nature-based solutions is a crucial step toward healthier, happier, and more livable urban environments. As inflation drives up the prices of traditional infrastructure and technology, nature-based solutions can provide a cost-effective alternative and can have long-term economic benefits, such as job creation, reduced healthcare costs, and enhanced resilience to future challenges.

The euPOLIS project case, with the success stories and challenges it has faced on the ground, highlights the importance of investing in sustainable projects and strategies. By adapting to the changing economic landscape and leveraging the cost-effectiveness of nature-based solutions, promoting education and awareness, fostering trust, ensuring inclusivity, providing meaningful incentives, and improving communication channels, cities can overcome these obstacles and encourage active citizen participation in creating sustainable and resilient urban environments.

Enhancements of Air Quality

One of the most immediate and noticeable benefits of nature-based solutions is their capacity to enhance air quality in cities. Trees and green spaces act as natural air filters, absorbing pollutants and releasing oxygen. By strategically planting trees along streets, parks, and rooftops, cities can reduce the levels of harmful pollutants, such as nitrogen dioxide and particulate matter, in the air. Cleaner air leads to a decrease in respiratory illnesses, cardiovascular diseases, and other related health issues among city dwellers.

Mitigation of Heat Islands

Urban areas often suffer from the "heat island" effect, where concrete, asphalt, and buildings absorb and retain heat, leading to elevated temperatures. Nature-based solutions, such as urban forests, green roofs, and vegetated walls, help mitigate this effect by providing shade, cooling the air, and reducing energy consumption. By lowering temperatures, these solutions minimize heat-related illnesses, such as heatstroke and dehydration, while also improving citizens' comfort and well-being during hot summer months.

Alleviation of Mental Stress

Living in densely populated urban environments can take a toll on mental health, resulting in increased stress, anxiety, and depression. Nature-based solutions offer a sanctuary of calm and respite from the bustling cityscape. Access to parks, gardens, and green spaces provides opportunities for relaxation, recreation, and physical activity. Spending time in nature has been scientifically proven to reduce stress levels, enhance mood, and improve cognitive function. By incorporating green spaces into urban design, cities create natural sanctuaries that contribute to citizens' mental well-being.

Promotion of Physical Activity

Nature-based solutions encourage citizens to engage in physical activity, addressing sedentary lifestyles that are prevalent in urban settings. Parks, walking trails, and bike paths provide accessible and safe spaces for exercise, promoting active lifestyles. Regular physical activity reduces the risk of chronic diseases such as obesity, diabetes, and cardiovascular conditions. Additionally, green environments enhance the overall appeal and motivation for individuals to engage in physical activities, improving their physical health and quality of life.

Strengthening of Social Cohesion

Nature-based solutions play a vital role in fostering social cohesion within communities. Public parks and green spaces provide gathering spots for residents to interact, socialize, and build connections. Community gardens, for instance, promote collaboration, knowledge sharing, and a sense of ownership. When people come together in these natural environments, social bonds are strengthened, leading to improved mental health and increased social support networks.

Enhancement of Biodiversity and Ecological Resilience

Nature-based solutions contribute to the preservation and restoration of urban biodiversity. By incorporating native plants, creating urban wetlands, or restoring natural habitats, cities can support diverse ecosystems and protect valuable flora and fauna. Biodiversity not only enhances the aesthetic appeal of urban spaces but also provides ecological services such as pollination, pest control, and water filtration. A healthier and more resilient urban environment supports human health and well-being in the long term.

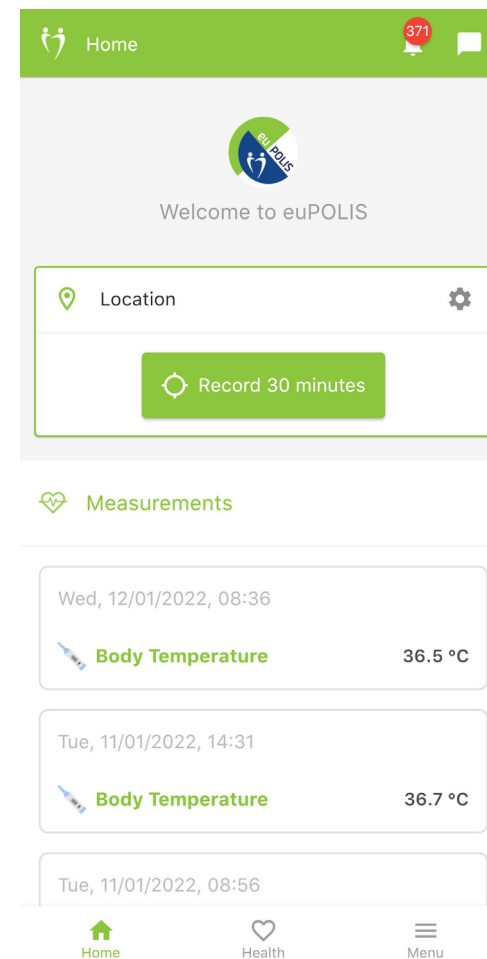
Advancing Urban Sustainability Through Nature-based Solutions, Evaluating the Impact of Interventions

AUTHORS:
Eftychios Protopapadakis, Elerina Karolou

Innovation does not only consider urban design, as it also includes the communities living in and around the project demonstration sites. euPOLIS creates a “blend-in matrix” which allows investigation and activates multifaced intersections between new development and neighborhood. In other terms, apart from direct NBS effects on Public Health (PH) & Well-being (WB), numerous cultural/social cohesion and interchange are expected (e.g., urban farms, socializing space, green schools, etc.).



We live in interesting, ever-changing times where technology plays an increasingly vital role in overcoming multiple challenges in our lives. However, technological development often appears as a threat to nature, forcing us to choose between progress and preservation. Any attempt to bring nature’s ways back into our life, to improve it, requires meticulous calculations and closely monitoring schemes.



Any tools and services, developed within euPOLIS, continuously adapt to newly discovered or emerging scenarios in areas of our interest, enabling us to showcase and document the positive changes NBS brings to our lives, health, and connections with the social and natural environment. All tools are based on state-of-the-art knowledge from their beginning, and have been further adapted to comply with project’s requirements.

Consider for example the utilization of a smartwatch, monitoring our heartbeat, daily steps and, if we want, our location when in a park. That’s all; a simple comparison, through time, of the health stats, when near a park area, allow us to investigate any effects that the NBS had. In a

similar. The new “euPOLIS by BioAssist” mobile/web app, based on the established BioAssist Platform, which supports an extended set of biosignals and measurements, was developed for this task.

Moving one step further, wearables can be used to check for emotion changes, e.g. going from sadness to joy, when standing in front of multiple flowers, close to streamlets, accompanied with canopies and a small bench to relax. This is achieved by using Electrodermal Activity (EDA) biosensor, coupled with a new app, provided by Sentio. Such technologies allow us to see the emotional effects of an NBS.

Green solutions need water, and in the pursuit of sustainable practices, greywater emerges as a vital resource. Greywater refers to wastewater generated from household activities like bathing, laundry, and kitchen use. One of its primary advantages lies in water conservation. Which are the best practices, possible economical gains, and support of new NBS are research topics worth investigating. The developed urban water simulation tools, consider all the above.

One image is worth a thousand words. That is why visualization tools are important when evaluating the impact of NBS. Such initiatives involve complex interactions between natural elements and human activities, making it challenging to grasp their full effects through words alone. By utilizing visualization tools, we can present data, trends, and outcomes in a concise, visual manner, facilitating a deeper understanding of the NBS’ performance and effectiveness.

“HEALTH” Trees for the Linear Park

AUTHOR:
Ranko Božović

As part of the implementation process of the euPOLIS innovative, health and well-being-related methodology, re-introducing trees and other vegetation that prevent certain groups of diseases into the urban cores, already started in one of the demo locations in Belgrade.

After learning about the prevailing health challenges within the local community, through questionnaires, and live conversations, our euPOLIS experts created lists of recommended plants with characteristics that have direct healing effects on the circulation system, cardio, respiratory, and metabolic diseases, the “healthy” trees.

The actual planting will further depend on the local conditions. The combination of typical local medical disorders with indigenous “healthy” vegetation, will be the first line of action.

The Belgrade local team, dealing with two demonstration locations (Linear Park and a Zemunski key park) has discussed with the city management the introduction of such plants

with specific health benefits. The agreement was reached to create three “healthy zones” of one kilometer each, within the Linear Park. These zones will be populated with vegetation that has a positive impact on three particular health disorders: cardiovascular disease, metabolic disease, and respiratory disease.

These new green zones will serve as a test bed for our experts to track, measure, and compare health data provided by our volunteers who will wear biometric devices and spend prescribed time at our demo location. The end goal is to prove the positive impact of planted NBS on our physical and mental health.

Thanks to euPOLIS project innovations, this park will be the first one to functionally integrate medicine into urban planning.

Having in mind that the first “euPPOLIS” twenty trees are already planted, the green innovations in Belgrade might soon look like this:

Zone A, trees and bushes with a positive impact on the circular systems and cardiovascular diseases

Quercus sp. European oak Fagaceae, Crataegus monogyna Jack. Hawthorn Rosaceae Juss.



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<https://commons.wikimedia.org/w/index.php?curid=67233>

Rosa rugosa Thunb Rugosa rose Rosaceae Juss.



By Qwert1234 - Qwert1234's file, CC BY-SA 3.0
<https://commons.wikimedia.org/w/index.php?curid=10673268>

Tilia cordata Mill. Small-leaved linden Malvaceae



<https://commons.wikimedia.org/w/index.php?curid=90060331>

Zone B, trees and bushes with a positive impact on the respiratory system

Sambucus nigra L. Elder Adoxaceae



By Willow - Own work, CC BY 2.5,
<https://commons.wikimedia.org/w/index.php?curid=2643905>

Pinus sylvestris L. European red pine Pinaceae



By ancientsword at Flickr - Flickr, CC BY-SA 2.0,
<https://commons.wikimedia.org/w/index.php?curid=6320102>

Gleditsia triacanthos L. Honey locust Fabaceae



By Kevmin - Own work, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=8267558>

ZONE C, trees and bushes with a positive impact on the metabolic system

Acer platanoides - Sapindaceae Juss.



<https://commons.wikimedia.org/w/index.php?curid=89123211>

Metasequoia glyptostroboides - The dawn redwood Sequoioideae



<https://commons.wikimedia.org/w/index.php?curid=39732167>

Larix decidua, Mill., European larch Pinaceae

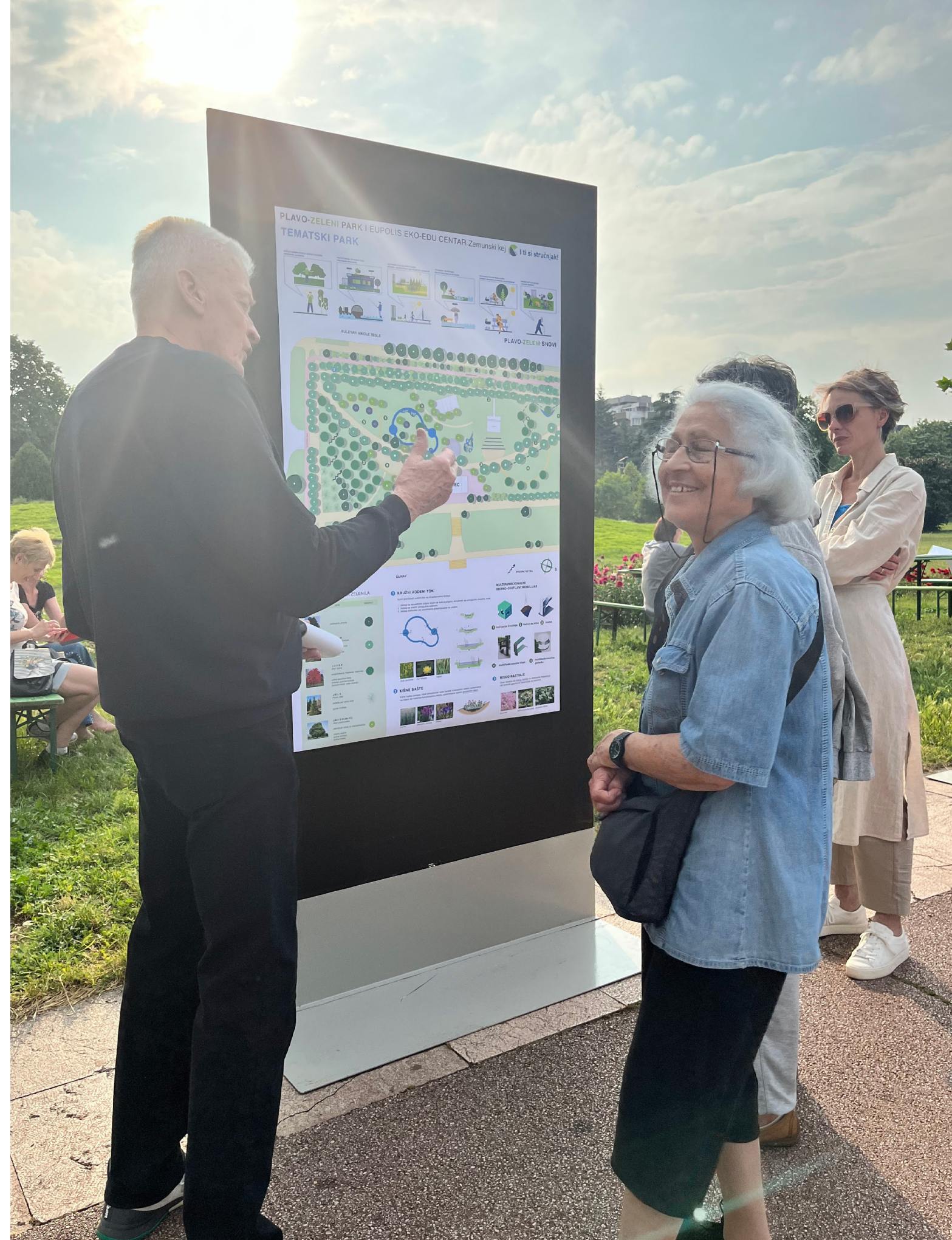


<https://commons.wikimedia.org/w/index.php?curid=90060331>

Quercus petraea (Matt.) Liebl. Fagaceae Sessile oak



<https://commons.wikimedia.org/w/index.php?curid=90060331>



NBS Ecosystem – The euPOLIS Role

AUTHOR:

Emmanuel Sardis



Clustering activities and the ecosystem of projects involve a range of activities aimed at promoting collaboration, knowledge sharing, and innovation in the field of clustering between European-funded projects. These activities are typically carried out by various organizations, including research institutions, universities, industry associations, and government agencies. One of these involved projects that play a significant role in this ecosystem is [euPOLIS](#).

In specific euPOLIS has achieved a synergy with the cluster of projects IN-HABIT, goGREENROUTES and VARCITIES under H2020 SC5-20-2019 on transforming historic urban areas into hubs of entrepreneurship and social and cultural integration.

Additionally, euPOLIS is cooperating and has a synergy with the projects funded under the H2020 SC1 Health, demographic change, and wellbeing (ENLIGHTEN ME, URBANOME, RECETAS, EMOTIONAL CITIES, HEART, WELLBASED).

Further clustering actions are also supported related to euPOLIS consortium connections, participations, and relationships with other consortium partners to extend and enhance the euPOLIS impact.

▪ **NBS Task Forces**

The [EU Horizon 2020](#) projects that focus on Nature-Based Solutions (NBS) are 'clustered' around a range of topics including sustainable urban development, social cohesion, public health, water and climate resilience and disaster risk reduction. New projects will be starting on a regular basis as a result of ongoing Horizon 2020 and [Horizon Europe](#) calls, such as the [European Green Deal](#) call for biodiversity and ecosystem restoration.

In response to particular calls, these projects work on several transversal topic areas, often with different approaches and with varying outputs produced. In order to gather and synthesize the variety of approaches and outputs, ensure the EU added value and policy relevance of this coherent portfolio, as well as to maximize social, ecological, and innovation impact, the projects are, 'clustered' around several key transversal topic areas.

▪ **Clustering activities benefits**

Clusters can benefit from synergies between H2020 projects. Among the specific ways of H2020 of such beneficiary and fruitful outcomes can be the below list.

-Clustering Policy Development, euPOLIS could work closely with government bodies to develop policies and initiatives that encourage clustering activities. It may provide expertise and guidance on issues such as funding mechanisms, regulatory frameworks, and incentive programs to stimulate clustering efforts.

-Research and Development Support, euPOLIS and Sister projects cluster could facilitate research collaborations, it may organize conferences, workshops, and seminars to bring together researchers, practitioners, and industry experts to share knowledge and promote innovation in the

field. Exchange research and technical information between the projects to contribute for a cross-fertilisation of results leading to a stronger, more accurate vision of the NBS expectations.

Maximise the impact of the communication and dissemination of results amongst the relevant stakeholders by joining forces, rather than having each project operating individually.

Additionally, H2020 project results are used or further developed with subsequent investments to improve the innovation eco-system in a territory that facilitates follow-up to successful RDI activities, in order to bring them either higher up on the technology readiness level scale (closer to commercialisation), for instance regarding technology parks, clusters, partnerships between research, education and business, Living-Labs, demonstrators, etc.

-Best Practice Dissemination, euPOLIS and Sister projects cluster try to identify and promote best practices in clustering activities. They collect and disseminate success stories, case studies, and lessons learned from different clustering projects and case studies. This information can help stakeholders learn from each other's experiences and improve their own clustering initiatives.

-Capacity Building and Training, euPOLIS and Sister projects cluster will offer training programs, workshops, and capacity-building activities to enhance the skills and knowledge of individuals and organizations involved in clustering. This could include topics such as cluster management, data analysis techniques, emerging technologies, and innovation strategies.

-Networking and Collaboration, euPOLIS and Sister projects cluster serve as a platform for networking and collaboration among different clusters, industry sectors, and geographic regions. By organizing matchmaking events, forums, and cluster meetups to facilitate knowledge exchange,

Sister Projects Cluster (SC5-14-2019)

partnerships, and business collaborations, giving an improvement of social capital as assistance for building networks, clusters and new consortia. Give an opportunity "to explore" the potential for synergies between partners of different consortiums, but with common research or business activities in local or EU territory.

-International Collaboration, also important is their international presentation and cooperation with similar institutions globally, through the new consortium infrastructures that provide partners globally, by promoting the pan-European Strategic Cluster Partnerships to lead international cluster cooperation in new areas.

-Highlight the importance of EU funding programs in supporting European Research and Innovation able to stand out in an ever-changing world, where top-notch R&D has become the standard. Fulfil the European Commission's expectation of an integrated collaborative approach between the H2020 projects.

euPOLIS action plan aims to facilitate and achieve access between H2020 project consortiums and take advantage of better synergies between regional, national, and European instruments to support this interregional collaboration. Setting up of an Expert Group in euPOLIS that will discover possible synergies, between the European programs could be exploited to better support research and innovation.

Furthermore, the project exploitations activities, at the end of the project, will get benefit from these synergies and partners will be able to explore solutions to leverage public-private investments, through European organizations for supporting demonstrations and piloting of new value chains in European industry clusters.

Ec visionary to improve well-being and health in cities between the 4 sister projects

The main areas of cooperation between euPOLIS and similar in topics EU project the named "Sister projects cluster" that is composed of the projects INHABIT, goGREENROUTES, and VARCITIES in H2020, could be summarized in the following topics and activities

- Baseline and Indicators for Wellbeing and Health, aiming to create an output that will contain a list of joint indicators that will be defined between the clusters and have as a guideline the current NBS Handbook on Indicators and Assessment .

- [A Manifesto](#) with a common narrative on the subsidiarity principle applied to well-being and health. Which is aiming to address: How can we define health and well-being at the local level? What is "locality" in this respect? Are we considering the whole city, just a district, or a neighborhood? Could we use GPS coordinates? This Manifesto could complement the work that the OECD is doing on well-being at the regional level.

- A Gender, Diversity, Equity & Inclusion (GDE & I) common deliverable. The main cooperation outputs could be focused on

- Monitoring all co-creation and co-deployment activities.

- A common strategy to define the set of personal characteristics (i.e. sex, age, gender, identity, sexual orientation, disability, ethnicity, etc.) to be included when engaging diverse citizens.

- Investigation for new technologies to monitor progress and bottlenecks in GDE&I (i.e. AI to tackle unconscious bias, AI for emotion recognition, biosensors, etc.).

SC5-14-2019

Visionary and integrated solutions to improve well-being and health in cities: Clustering Activities

Joint Manifesto

Contributors: GoGreenRoutes: Tadhg MacIntyre and Maria Fernandez de Osso Fuentes; IN-HABIT: M Mar Delgado, Zacarias Gulliver and Isotta Mac Fadden; VARCITIES: Elisavet Tsekeri, Kurt Calleja, Katerina Lilli, Daniel Micallef, and Denia Kolokotsa; euPOLIS: Afroditi Mathioudaki, Anja Randelovic, Anna Domaradzka, Magdalena Kolodziejczyk, Mikołaj Biesaga, Alexandra Malusev, and Nikolaos Doulamis.




1. Berlin, DE
2. Ljubljana, SI
3. Limerick, IE
4. Mytilene, GR
5. Limerick, IE
6. Limerick, IE
7. Limerick, IE
8. Limerick, IE
9. Limerick, IE
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17. Limerick, IE
18. Limerick, IE
19. Limerick, IE
20. Limerick, IE


OBJECTIVES

The following is a joint manifesto from four sister projects which calls on European cities to launch initiatives that offer visionary and integrated solutions at the intersection of social, cultural, digital and nature-based solutions (NBS) to increase the health and well-being of citizens. We are funded under the call SC5-14-2019 to address the challenge in an ambitious way and we commenced our innovation actions in September 2020 running for between 4 and 5 years.

5 MILLION
Citizens
across
21 CITIES

IN-HABIT, VARCITIES, euPOLIS and GoGreenRoutes are committed to achieving a series of bespoke visionary solutions to promote health and well-being in urban conurbations, by establishing sustainable and inclusive models for increasing the health and well-being of citizens exposed to different climatic conditions and societal challenges. Our projects working across almost two dozen urban conurbations in Europe with links to urban centres beyond work with a total of nearly five million citizens.





GoGreenRoutes, IN-HABIT, VARCITIES and euPOLIS are funded under Horizon 2020 Programme with grant agreements no 869764, 869227, 869505 and 869448.

I. NATURE-BASED SOLUTIONS

II. HEALTHY AND SUSTAINABLE URBAN AREAS

III. CULTURE & ARTS

Culture, arts and heritage are undervalued resources to boost inclusive health and wellbeing that should be researched and promoted.

IV. GENDER, INCLUSION & DIVERSITY

V. DIGITAL INNOVATION

ENDORSEMENT

We the undersigned commit to:

- Reaffirm the collective commitment to respect the right of all people to attain the highest levels of well-being and physical and mental health.
- Demonstrate how the integration of social, cultural, digital and nature-based solutions into urban design and planning might reduce health-related environmental burdens in socially deprived neighbourhoods, foster equitable access for all to public spaces, enhance their quality and use and promote sustainable urban mobility patterns.
- Underline the need for strong political commitments to ensure the access to health and wellbeing, especially among the most disadvantaged and vulnerable groups and the importance of considering gender, diversity, inclusion and equity aspects, to ensure that no one is left behind.
- Emphasise the need to implement measures to protect, conserve, sustainably use and restore public spaces, and to ensure cities' sustainability and resilience and the contribution of public spaces to health and wellbeing.
- Meet the needs for strong public, private and citizen's commitments to increase health and wellbeing by achieving greenhouse gas emission neutrality/carbon neutrality by 2050, sustainable mobility and preservation of biodiversity, considering the latest scientific developments and the local circumstances.
- Prioritise the importance of revitalising green, social and health infrastructure investment in a sustainable, inclusive, accessible, and affordable way.

Signed by



ACTION PLAN

Our Shared vision in future actions to advance integrated solutions to improve well-being and health in cities

Democratising Equitable access to health and wellbeing as universal right for all citizens independently of their social and economic status.	Supported Working with Governments, 2020 digital partners, and NGOs that respect and support the value sharing created.	Transformative All can be agents of change for health, wellbeing and sustainability, shifting to a new way of thinking and acting.
Just and Fair Ensuring environmental justice, equity and equality are at the cornerstone of our actions.	Embedded Strongly rooted in the needs of individuals, communities and their environments.	Creative Imaginative, innovative and disruptive with new designs for the people and place.
Evidence-based Scientific evidence (e.g. participatory methods, use of advanced sensor technologies) should guide actions.	Connected Working with nature, for nature, for people in a cohesive way that enriches connections.	Biodiverse Ensuring biodiversity is protected, enhanced and restored to promote ecosystems aiming for Nature 2030.
Future looking Proactive approach that put the focus on addressing the future needs of citizens, considering actual and potentially emerging trends.	Inclusive Dedicated approach to ensure access to nature for the most vulnerable, specially those with protected characteristics.	No one left behind Actions should be co-created, co-designed, co-validated and co-evaluated with all stakeholders included those traditionally excluded.
Sustainable Proactive approach that put the focus on addressing the future needs of citizens, considering actual and potentially emerging trends.	Engaged Dedicated approach to ensure access to nature for the most vulnerable, specially those with protected characteristics.	Healthy Dedicated approach to promote health, mental health and wellbeing, and target the reduction of disease.

Forthcoming activities from 'Sister projects cluster':

- a common deliverable "Gender Inclusion and Diversity Policy Context"
- a common deliverable "Indicators", from Front Runner-FR cities pilot areas in Sister projects case studies
- Common Dissemination Activities and Research Outcomes



IN-HABIT has received funding from the European Union's Horizon 2020 program H2020-EU-3.5.2., under grant agreement No 869227.

euPOLIS has received funding from the European Union's Horizon 2020 program H2020-EU-3.5.2., under grant agreement No 869448.

VARCITIES has received funding from the European Union's Horizon 2020 program H2020-EU-3.5.2., under grant agreement No 869505.

goGREENROUTES has received funding from the European Union's Horizon 2020 program H2020-EU-3.5.2., under grant agreement No 869764.

VFI @ GreenTech Amsterdam – All Eyes on Urban Horticulture

AUTHORS:

Aleksandra Malušev, Daniel Podmirseg



The Vertical Farm Institute, one of the partners in the euPOLIS mission who invests their knowledge and experience to help empower citizens to embrace healthier lifestyles by, among other things, choosing locally grown and produced foods, has been a partner of one of the largest horticulture shows worldwide in Amsterdam for two years - the hub of food production in the horticulture sector.

The role of the VFI is to expand the content of the fair from a pure greenhouse production perspective. Accordingly, the question arises, for

example, to what extent food production in cities - even on a small scale - can be intensified.

The focus of euPOLIS on nature-based solutions and blue-green systems meets with a lively interest in this industry, especially as the greenhouse industry is not spared the challenges of the systemic transformation of our production methods. Topics such as water, energy, and material flows also address the future of indoor food production.

Citizens worldwide now understand how fragile, energy-intensive, land-consuming, and oil-dependent



our food system is. No individual can solve the problem of food security, it takes a massive collective wake-up. Get-togethers of engaged people, plus knowledge of the status quo of world agriculture and prosperous pioneer projects are necessary to trigger both political engagement and hands-on solutions within the urban environment.

The VFI used the opportunity of the three-day event to present the euPOLIS project and its goals, for example at the fringe events in world café format or panel discussions. In addition, two exemplary research projects were presented in their own exhibition pavilion: a prototypical modular system in container construction for urban food production and the eco edu hub, the exhibition pavilion in Belgrade for NBS and BGS. In both, the focus on energy potentials and climate characteristics of the front-runner cities Belgrade, Lodz, Gladsaxe, and Piraeus play an overriding role in terms of content and presentation.

Vertical farming is an important vehicle to exemplify and communicate NBS and BGS. As a new building typology, it not only increases the resilience of the city of the future but is also considered an important structural element of the urban system to close energy and material flows. With every square meter of agricultural use next to a consumer, we produce a long list of positive externalities - such as reduction of land use, deforestation, fertility loss, water

consumption, oil dependency, etc. Urban farming and especially vertical farming is something not immediately applicable on a big scale, but from low-tech-implementations (which affect interest and engagement) through high-tech-indoor production methods, to the integration of food production areas or spaces in masterplans and regulations, engaged citizens are necessary to fulfill future needs in food supply for our children.



Urban Planning Gamification by euPOLIS

AUTHOR:
Aleksandra Malušev

As part of creating and developing tools and methodologies to level up urban planning, creating sustainable, livable, and resilient cities for the future – now, a euPOLIS expert, Ioannis Kavouras from the National Technical University of Athens, made a demo version of the euPOLIS urban planning game. This tool is planned to be used in engaging citizens in the decision-making and city-designing processes, by giving their feedback thus helping experts and authorities interweave their point of view when creating urban spaces.

Video games have been a part of our growing-up journey since the eighties, and they have changed the perception of those generations towards many aspects of reality. With that came an ever-growing gap between the older generations, not only regarding spending our free time, but also creativity, responsibility, and relationship with the world around us, and ultimately, making so far ways and methodologies of how we used to get things done, obsolete, costly, non-effective and even harmful.

Bringing advanced, engaging, and visually appealing games into learning processes and education is already yesterday's news. Nowadays, we use quite a selection of „funky“ tools that resemble play rather than serious work. However, such tools help us predict and create scenarios for an intricate plethora of events, including social, natural, and technological aspects.

To overcome challenges that vary from one to another of our demo locations in Gladsaxe (DK), Lodz (PL), Belgrade (RS), and Piraeus (GR), Ph.D. Candidate Kavouras developed an interactive game that offers a distinct scenario, depending on the chosen demo site, guiding the character out and about. The player can choose a shaded pedestrian zone, walk on the side directly exposed to sunlight, next to the walls, or follow along the riverbank. The current version of the game does not yet provide real-life and real-time environmental conditions on the spot. Still, it gives a calculated overview of the situation and how it affects the character's well-being based on the historical data of the site.

The character can also intervene by placing new plants wherever the player chooses, benches, and other outdoor furniture. Once our volunteers start wearing biometrical devices and the game



is upgraded, they will be able to choose actual euPOLIS-proposed plants from the atlas our experts developed, that are positively associated with cardiovascular, respiratory, and metabolic diseases.

This demo version of the game was recently tested among the young pupils of the Ralleion Pilot Elementary school in Piraeus Municipality with the Vice Mayor of Piraeus Antonia Karakatsani, Julia Nerantzia Tzortzi, Angeliki Paraskevopoulou, Efthymios Chardavellas, Anna Domaradzka, Ewa Domaradzka, Sandra Baki, and Ioannis Kavouras.

Our experts and partners asked the children:

- To identify birds and butterflies that they recognize daily
- To identify plant species in specified areas of their school
- To draw intervention in the existing space

(monochrome drawings of the school were given) and identify the areas that are preferable for the students.

Ioannis Kavouras presented the euPOLIS game (a game designed with Unreal Engine) where students could see the area and add interventions, an experience they showed great interest in.

To help us get the most accurate feel of the place and your desires as citizens and users of these sites, hop in and play our game! [By filling out the questionnaire](#) you will provide our experts with an invaluable knowledge that will be used to upgrade the game further.

Download the game [HERE!](#)

The Implementation of the euPOLIS philosophy: The Technology And The Mindset

AUTHOR:
Aleksandra Malužev

During the past few months, the euPOLIS local teams in each Front Runner City (Gladsaxe, Lodz, Belgrade, and Piraeus) have taken the first steps toward the implementation of the NBS technologies.

This means closer than ever collaboration with the local citizens who will be wearing the biometrical wristbands, monitoring their activities and health status while on the designated testing location, but also transforming the location by bringing in nature-based solutions. This will, besides the effects on the physical health of the residents, affect the social cohesion on the spot and increase the sense of ownership of the place. As a reminder, euPOLIS aims to improve the public health and well-being of the residents, but also transform the decision-making process, giving more room to the citizens-experts to express their needs of the public spaces.

The implementation process is closely monitored by our experts, to be able to precisely recognize all local specifics, whether they are a challenge or an asset, and address them efficiently.

In the case of Gladsaxe, preparation actions to start purchasing the monitoring equipment are ongoing. The recruitment of participants for the personal testing with wearables was done during Autumn 2022, despite the barriers encountered such as low turnouts and difficulties in delivering devices due to low digital literacy levels among the residents. The NBS implementation process is ongoing with the detailed designs being finished now, and the approval of tender material by the housing association is expected to take place in March.

The Polish City of Lodz is also getting ready for both the environment and the personal testing and preparation actions that have been undertaken by the municipality. When it comes to NBS implementation, Lodz architects will start working at the beginning of February with the

detailed designs of the linear park. We expect the construction to kick off in the Autumn of 2023.

When it comes to Belgrade, both the environmental and personal monitoring is under preparation and expected to be taken by the selected responsible worker at the municipality. The process begins by planting 20 specific trees at specific micro-locations on the Zemun quay near the pillars of the Old Railway Station, one of the most popular urban getaways that attract visitors, recreationists, and outdoor enthusiasts all year round.

Thanks to the local expert teams of the Faculty of Civil Engineering, Belgrade, En Plus Company, and Mikser Organization, with the full support of the City of Belgrade's public utility company Gradsko zelenilo (City Greenery), the initial portion of 20 trees with the features to mitigate climate change and support visitors' wellbeing, was planted late December, with additional 150 to follow!

The local expert team selected seedlings that will mitigate respiratory, cardiovascular, and other health disorders, and do not cause allergic reactions. For example, the tree *Quercus palustris* (swampoak), with its secretion has a positive effect on the cardiovascular system, and simultaneously significantly cools the air by evaporation from the large surface of leaves.

This effect is achieved by selecting plants with specific properties, from the shape and size of the tree and leaves to the density of the canopy. Their chemotaxonomic characteristics (volatile/vaporizable components) play a significant role, affecting the preconditions for developing the above-mentioned health conditions. By developing a distinct planting geometry and diversity of species, the euPOLIS experts aim to synergize all these characteristics of different plants to regenerate biodiversity (attracting insects, birds, and small animals...)



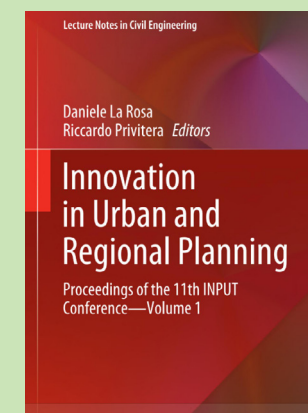
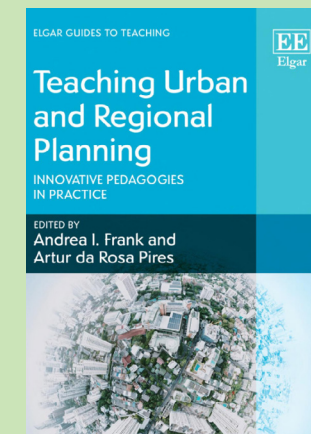
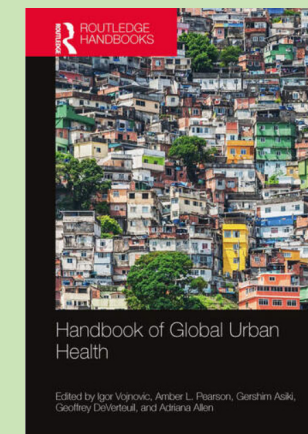
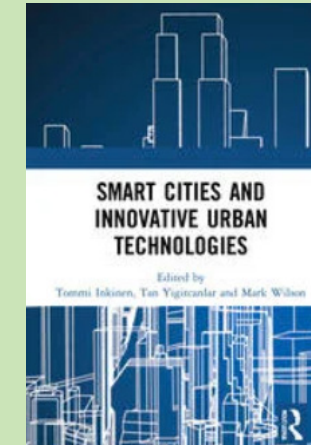
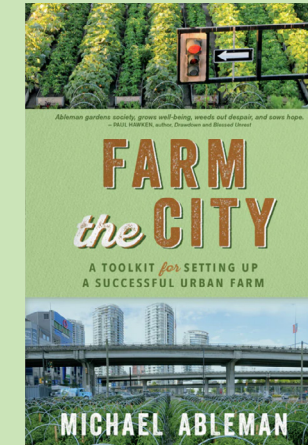
This micro-climate park will soon also feature an eco-edu hub designed to demonstrate a clean, healthy, and top-notch urban wastewater management system, along with vertical farming solutions, to attract, educate, and befriend local residents, and experts to embrace new ways of planning and living in cities.

In the city of Piraeus, the main achievement is the start of the implementation of the monitoring equipment on the demo sites. Some sensors and probes were installed, and they are already collecting data for the pre-construction database. Piraeus is also making progress regarding the NBS implementation, which we expect soon to be approved by the municipality.

The “smart” bench was procured and installed in Mikrolimano by the Department of Environment and Greenery of the Municipality of Piraeus, as part of the euPOLIS NBS implementation process. It was designed, produced, and installed by the Energy4Smart company.



euPOLIS Good Reads



 <https://www.facebook.com/eupolis2020>

 https://twitter.com/eu_polis

 <https://linkedin.com/company/eupolis>

 <https://eupolis-project.eu>



euPolis has received funding from the European Union's Horizon 2020 program H2020-EU.3.5.2., under grant agreement No 869448.